

## A NEW SPECIES OF BULLFROG FROM FLORIDA AND THE GULF COAST.

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A few years ago Mr. Robert Ridgway, returning from a collecting trip in southern Florida, assured me that the bullfrog there had such a peculiar voice that he could scarcely believe it to be the same species as the one found elsewhere in the United States. Moreover, it was so excessively shy and wary that he had failed to secure any specimens. Requests were sent to various correspondents to catch and forward specimens, but they were equally unsuccessful.

During the summer of 1900 Mr. Gerrit S. Miller, jr., obtained a series of live bullfrogs from New Hampshire and another from Bay St. Louis, Mississippi, all of which he kindly donated to the Museum. It was at once apparent that there was a great difference between the two lots, the northern ones being much greener and lighter, the southern specimens being brown and dark, with very little green. The large series of alcoholic bullfrogs in the collection of the U. S. National Museum failed to throw any light upon this question. The difference of the proportions of the toes was also noted, but as specimens from New Orleans did not correspond in this respect the importance of that character was not realized at the time, and the question of the specific or subspecific distinction of the Bay St. Louis specimens was left in abeyance pending the accumulation of additional material.

This additional material was obtained recently when Dr. E. A. Mearns, U. S. A., sent a lot of bullfrogs from Kissimmee, Florida, with the statement that their voice was entirely different from that of the northern bullfrogs, resembling the grunt of a herd of pigs. He also reported that they were very difficult to catch.

Here was clearly the Florida bullfrog mentioned by Mr. Ridgway, and a direct comparison with the Bay St. Louis specimens proved the identity of the Florida and Mississippi form. The whole series of the museum was then carefully reviewed, with the result of finding two additional specimens of the new species from Pensacola.

## RANA GRYLIO, new species.

*Diagnosis.*—Similar to *Rana catesbeiana*, but with the fourth toe much shorter in proportion, the third toe, measured from the inner metatarsal tubercle, being more than three and one-half times the difference between the third and fourth toes.

*Type.*—Cat. No. 27443, U.S.N.M.; Bay St. Louis, Mississippi.

*Habitat.*—Florida and Gulf coast west to Mississippi.

*Remarks.*—The most obvious difference between this species and the ordinary bullfrog (*Rana catesbeiana*) is the great length of the toes, except the fourth, the latter consequently projecting much less beyond the others than in *R. catesbeiana*, in which the third toe, measured from the inner metatarsal tubercle, is considerably less than three and one-half times the difference between it and the fourth toe. In fact, this difference is seldom more than one-fourth in the new species and seldom less than one-third in *R. catesbeiana*.

In order to ascertain exactly the proportions of the first four toes in both species large series of both species were measured, viz: 12 of *R. grylio* and 50 of *R. catesbeiana*, the measurements, as well as their equivalents expressed in percentages of the fourth toe, being given at the end of this article. In order to get as stable a starting point as possible for these measurements the anterior edge of the inner metatarsal tubercle was chosen and the length of the toe in this case consequently means the distance from this point to the tip of the toe in question.

The proportions obtained in this way may be expressed as follows:

	<i>Rana grylio.</i>	<i>Rana catesbeiana.</i>
	<i>Per cent of fourth toe.</i>	<i>Per cent of fourth toe.</i>
Third toe.....	80 to 84	70 to 76
Second toe.....	55 61	47 51
First toe.....	31 39	27 33

There is consequently no overlapping or intergrading. The fourth toe has the same relative length in both species, but in the new one the other toes have become considerably lengthened, thus giving a much larger surface of web than in the ordinary bullfrog.

From the above it will be seen that a specimen of *Rana grylio*, in which the distance from the tip of the fourth toe to the anterior edge of the inner metatarsal tubercle measures 50 mm., should normally have—

The first toe, similarly measured, 18.5 mm. (varying between 17 mm. and 19.5 mm.).

The second toe, similarly measured, 29 mm. (varying between 27.5 mm. and 30.5 mm.).

The third toe, similarly measured, 41 mm. (varying between 40 mm. and 42 mm.).

Conversely, a *Rana catesbeiana* of exactly the same size (fourth toe 50 mm.), should normally have—

The first toe, similarly measured, 15 mm. (varying between 13.5 mm. and 16.5 mm.).

The second toe, similarly measured, 24.5 mm. (varying between 23.5 mm. and 25.5 mm.).

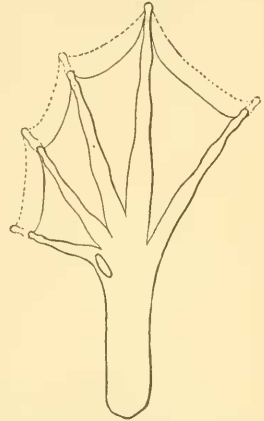
The third toe, similarly measured, 36.5 mm. (varying between 35 mm. and 38 mm.).

These average proportions are shown diagrammatically in the accompanying figure, in which the dotted outline represents an average *R. grylio* and the solid lines an average *Rana catesbeiana*.

These differences in the relative length of the toes, being capable of the most concise definition, have been utilized primarily for the characterization of the new species, but there are numerous other features which prove it to be very distinct from *R. catesbeiana*. Thus for instance, the snout is much shorter and less high, so that the nostrils appear to be nearer the tip of the mouth; the head is also narrower behind; the vomerine teeth are very close together, with hardly any space between the two patches; the tongue is much broader and thinner, with remarkably long and thin "horns," which are very far apart; the color is apparently much darker brown, though there may be *A. catesbeiana* nearly as dark. Add to this the difference in voice and we have clearly one of the most distinct species of frog in the United States.

The general habitus of *R. grylio* is that of *R. catesbeiana*, including the large tympanum and the absence of a dorso-lateral glandular fold. It is also a large frog, though whether it reaches the extreme size of *R. catesbeiana* may be doubted.

The range of the new species is as yet known but fragmentarily, as we have specimens only from southern Florida, Pensacola, Florida, and Bay St. Louis, Mississippi. The habitat of *R. grylio* is thus partly occupied by *R. catesbeiana*, which certainly occurs in northern Florida and on the Gulf coast reaches New Orleans. The overlapping of the two forms affords additional evidence of their specific distinctness, if such were needed. It may be mentioned in this connection that the most southern specimens of *R. catesbeiana* do not show the slightest tendency of a variation toward *R. grylio*, as is clearly proven by the measurements in the appended tables.



DIAGRAMMATIC OUTLINES OF HIND FEET OF *R. catesbeiana* AND *R. grylio*, THE FORMER IN SOLID LINES AND THE LATTER DOTTED.

Measurements of *Rana grylio*.

U.S.N.M. No.	Locality.	Distance of tip of toes from inner metatarsal tubercle.								Difference between third and fourth toes in milli- meters.
		In millimeters.				In percentages of fourth toe.				
		First toe.	Second toe.	Third toe.	Fourth toe.	First toe.	Second toe.	Third toe.	Fourth toe.	
27443	Bay St. Louis, Mississippi.....	21	33	46.5	57.5	36	57	80	100	11
27444	do.....	16	23.5	34	42.5	38	55	80	100	8.5
27445	do.....	19	30	42.5	53	36	56	80	100	10.5
27446	do.....	17	29	42	50	34	58	84	100	8
27447	do.....	18	28.5	40.5	49	37	58	83	100	8.5
3688 (a)	Pensacola, Florida.....	19	30.5	40	50	38	61	80	100	10
3688 (b)	do.....	17	27	37.5	46	37	58	81	100	8.5
29007	Kissimmee, Florida.....	17	26.5	38	45	38	59	81	100	7
29008	do.....	20.5	32	45	55.5	37	58	81	100	10.5
29009	do.....	9	14.5	20.5	25.5	35	57	80	100	5
29010	do.....	20	32	43.5	53.5	37	59	81	100	10
29011	do.....	12	19		31	39	61		100	.....
	Average of 12 specimens.....					37	58	81.3	100	.....

Measurements of *Rana catesbeiana*.

U.S.N.M. No.	Locality.	Distance of tip of toes from inner metatarsal tubercle.								Difference between third and fourth toes in milli- meters.
		In millimeters.				In percentages of fourth toe.				
		First toe.	Second toe.	Third toe.	Fourth toe.	First toe.	Second toe.	Third toe.	Fourth toe.	
9475	St. Johns River, Florida.....	15	26	39	53.5	28	49	73	100	14.5
3539	Prairie Mer Rouge, Louisiana.....	22.5	34.5	52.5	71	31	48	73	100	18.5
9469	New Orleans, Louisiana.....	21.5	35	52.5	70	30	50	74	100	17.5
13201	do.....	5	9	13	18	28	50	72	100	5
3687	Mobile, Alabama.....	21.5	34.5	52	72	30	48	72	100	20
9389	Liberty County, Georgia.....	9	15	22.5	30.5	29	49	73	100	8
3512	Riceboro, Georgia.....	10.5	18	26.5	36.5	29	49	72	100	10
3508	Charleston, South Carolina.....	15.5	24.5	37.5	50.5	31	49	74	100	13
10878	Oakley, South Carolina.....	23.5	38	57.5	78.5	30	48	70	100	21
10879	do.....	19.5	32.5	49	66.5	29	49	73	100	17.5
15984	Goldboro, North Carolina.....	11.5	19	29	39.5	30	49	75	100	10.5
15986	Raleigh, North Carolina.....	13	22	33	46	28	48	72	100	13
3691	Tarboro, North Carolina.....	16.5	28.5	42	57	29	50	73	100	15
14441 (a)	Wytheville, Virginia.....	19.5	31	45	61.5	31	50	72	100	16.5
14441 (b)	do.....	20	31.5	46	63	32	50	73	100	17
10346	Arlington, Virginia.....	20	32	48	64.5	31	50	74	100	16.5
10699	Southampton County, Virginia.....	20	33.5	49.5	67	30	50	74	100	17.5
15277	District of Columbia.....	11.5	19.5	29	41	28	47	70	100	12
14544	do.....	5	8.5	12	17	29	50	70	100	5
17365	do.....	14.5	25	37	50.5	29	49	73	100	13.5
26321	Laurel, Maryland.....	13.5	22.5	33.5	46	29	49	73	100	12.5
26320	do.....	16.5	28.5	42	58	28	49	72	100	16
3532	Carlisle, Pennsylvania.....	19.5	32	46	65	30	49	70	100	19
3531 (a)	do.....	13	22	32	44	29	50	73	100	12
3531 (b)	do.....	17.5	28	40.5	56	31	50	72	100	15.5
3513	Lancaster County, Pennsylvania.....	18	28.5	43.5	58.5	31	48	74	100	15
4835	Brookville, Pennsylvania.....	15.5	24	36	48.5	32	49	74	100	12.5
3534 (a)	Saratoga Lake, New York.....	10	17.5	26	36.5	27	48	71	100	10.5
3534 (b)	do.....	13.5	23	34	46	29	50	74	100	12
3531 (c)	do.....	17	25.5	39	51	33	50	76	100	12
3533 (a)	Westport, New York.....	14.5	24	35	48	30	50	73	100	13
3533 (b)	do.....	18	29.5	44.5	59.5	30	49	75	100	15
3507 (a)	Elizabethtown, New York.....	10.5	18	26.5	36.5	29	49	72	100	10
3507 (b)	do.....	13	21	32	42.5	30	49	75	100	10.5
3507 (c)	do.....	13.5	21	32	43.5	31	48	73	100	11.5

Measurements of *Rana catesbeiana*—Continued.

U. S. N. M. No.	Locality.	Distance of tip of toes from inner metatarsal tubercle.								
		In millimeters.				In percentages of fourth toe.				
		First toe.	Second toe.	Third toe.	Fourth toe.	First toe.	Second toe.	Third toe.	Fourth toe.	Difference between third and fourth toes in millimeters.
3507 (d)	Elizabethtown, New York.....	11.5	19	28.5	38.5	30	49	74	100	10
3507 (e)	.....do.....	13	20.5	30.5	41	31	50	74	100	10.5
3507 (f)	.....do.....	11	18	27	36.5	30	49	74	100	9.5
27435	Intervale, New Hampshire.....	19	29	44	59.5	32	49	74	100	15.5
27437	.....do.....	18.5	30	43.5	60	31	50	72	100	16.5
27438	.....do.....	17.5	29.5	43.5	59	29	50	73	100	15.5
27439	.....do.....	18	28	43.5	57	31	49	76	100	13.5
27440	.....do.....	16.5	28.5	41.5	57	29	50	73	100	16.5
27441	.....do.....	19	30	45	60	31	50	75	100	15
27442	.....do.....	11.5	18.5	27.5	37	31	50	74	100	9.5
3339	Rock Mary.....	13	21	32.5	42.5	30	49	76	100	10
3337	Red Rock, Arkansas.....	24	38.5	58	77	31	50	75	100	19
3321 (a)	Fort Smith, Arkansas.....	7.5	11.5	17.5	23	32	50	76	100	5.5
3321 (b)	.....do.....	7	11	16.5	22.5	31	49	73	100	6
3520	St. Louis, Missouri.....	12.5	20	30	40	31	50	75	100	10
	Average of 50 specimens....					30	49.2	73.2	100	.....